The newsletter of
The Acoustical Society of America

ECHOES

Volume 3, Number 4
Winter 1994

Acoustical Design of Meeting Rooms
(Or, will the kitchen please cease and desist?)

by Ewart A. Wetherill

VISUALIZE A COMMUNITY DINNER in the church's fellowship hall. Conversation during the meal becomes increasingly difficult because of the chatter of many voices and the clatter of dishes. When the meal is over the dishes and tables are quickly removed, the chairs are rearranged, and the guest of honor starts to speak . . . but cannot be heard over the commotion of dishwashing in the adjacent kitchen.

This same situation, so familiar to everyone, is frequently found in conference and meeting facilities. It is complicated further by the need to use surrounding spaces simultaneously. Add to it the use of sound amplification and video systems, and in some cases teleconferencing, and the acoustical requirements become a major concern. The basic fact is that most of these problems would not have occurred if the requirements of all the contributors of the various disciplines were integrated into the design of the building.

The booming convention industry

The growth of jet travel in the '60s and '70s was accompanied by the emergence of the convention industry as a major economic activity in North America. Older civic halls and hotel ballrooms, which had served a wide range of meeting and social needs, began to be replaced by a new generation of elaborate convention facilities designed to accommodate groups of all sizes. In response to the potential tourist market, municipalities and hotels have developed vast complexes with large divisible spaces. The construction of these facilities continues today as cities and resorts strive to outdo each other in attracting major conferences.

Despite a continuing emphasis on refinement and sophistication, however, these convention centers often fail to provide suitable conditions for good listening. The fact that people tolerate these conditions is somewhat mysterious. Why would the same people who purchase super-quality audio systems for their homes pay high travel and hotel costs to attend a convention in noisy, distracting facilities?

Problems

The most common acoustical problems in meeting facilities are: (1) inadequate isolation of meeting rooms for sound from adjacent rooms, service areas, and external sources, such as traffic and aircraft; (2) air-conditioning systems that are noisy enough to overpower anything less than a loudly amplified voice; (3) rooms that are excessively reverberant; and (4) sound amplification systems that are inadequate for a large and many-faceted convention.

Many acoustical problems that are built in could have been avoided by careful planning. In one such situation, the plumbing of the restrooms was connected to the auditorium's rear wall. To this day, whenever a flush-valve is activated, the whole audience can hear it, prompting a notice on the wall of each restroom: "Please try not to flush during a performance." Although this noise intrusion is a great inconvenience to the users of the hall (and the restrooms), the people in charge of repairs and modifications still do not place it high on their list of priorities.

Since the construction methods for avoiding such shortcomings have been routine practice for decades, why should they be neglected in facilities that are so obviously dependent on satisfied visitors? The answer is probably the lack of understanding of how the behavior of sound is influenced by the building's construction. The acoustical principles are fairly straightforward, but complications can intervene as these principles are translated into bricks and mortar. For some reason that is not entirely clear, control of sound is not seen as a serious issue by the building industry in general, and by the professional schools in particular.

The high cost of building creates scheduling and budget pressures, limiting the time available for refinement of construction details or for the coordination of the various building trades. In addition, a vast and changing array of building codes and regulations adds further complexity to an unwieldy process that requires the integration of advanced technology

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We hear that . . .

ASA's Congressional Science and Engineering Fellow, **Elizabeth Cohen,** has taken a job in the White House. She is working in the National Economic Council's Science, Technology, and Infrastructure Group on the National Information Infrastructure project.

Walter H. Munk, a professor at the Institute of Geophysics and Planetary Physics at the Scripps Institution of Oceanography, received the Vetlesen Prize from Columbia University for his work in using sound to measure changes in ocean temperature.

Rajendra Singh, professor of mechanical engineering at the Ohio State University, received the George Westinghouse Award from the American Society for Engineering Education for distinguished contributions to the teaching of engineering students.

An ASA former president and gold medalist, **James Flanagan,** has been named Vice President for Research at Rutgers University. He joined Rutgers in 1990 after extended service in research and management positions at AT&T Bell Laboratories.

Robert A. Frosch, senior research fellow at Harvard's John F. Kennedy School of Government, has joined the Program Office staff of the National Academy of Engineering as an NAE senior fellow.

Manfred R. Schroeder, another ASA gold medalist, was awarded the 1992 Niedersachsenpreis, the highest science award of Niedersachsen, the former kingdom of Hanover, for his contributions to speech processing and acoustics, including concert hall acoustics. Schroeder is the director of the Drittes Physikalisches Institut at the University of Göttingen.

The American Academy for the Advancement of Science has named three ASA members as AAAS Fellows: in Geology, **George Sutton** of Woods Hole Oceanographic Institution; in Physics, **Stanley M. Flatté** of the University of California, Santa Cruz; and in Psychology, **Patricia K. Kuhl** of the University of Washington.

ECHOES

Newsletter of the Acoustical Society of America
Provided as a benefit of membership to ASA members

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with construction methods familiar to the ancient Romans.

In the scale of importance, safety considerations such as fire egress and structural adequacy typically receive first priority, followed by health requirements such as air and water quality. At the bottom of the scale are the intangibles of light and sound. Acoustics, being an unseen dimension of a visually oriented industry, is usually determined by decisions made in other disciplines so it is not surprising that the building without acoustical problems is the exception.

Basic solutions

Good acoustics is not necessarily a cost issue, but one of using the required materials to best effect. In its simplest terms, each space in the convention center should be free of intruding unwanted sounds, and its design should reinforce and enhance the quality of sounds that people wish to hear.

These basic acoustical requirements must first be translated into building construction requirements:

- Quiet background requires an *enclosure*, which in turn requires a *quiet ventilation* system
- Adequate loudness and clarity of sound require suitable *shaping* of the space and appropriate *interior finishes*, possibly with sound amplification

Enclosure

To isolate a space successfully requires attention to many details, such as eliminating cross-talk by way of return air openings and quieting the noise of lighting dimmers, as well as selecting the appropriate construction system. Returning to the example of the fellowship hall, the problem could be eliminated entirely by adding a vestibule to act as a soundlock from the kitchen and serving hatches that provide an airtight seal, and by relocating the dishwasher on a remote wall. These are easily resolved on the drawing board but are much more difficult after the fact.

Most meeting facilities require movable partitions for flexibility in combining or subdividing spaces. These partitions are built from large wall panels suspended from rollers on a ceiling track, and even the best available provide limited acoustical separation. They are very expensive and must be set in place carefully—each time—to ensure that joints are tightly sealed. Proper use of movable partitions seems to be a universal problem in an industry with a rapid staff turnover.

Ventilation

An acoustically satisfactory ventilation system can be assured by conservative system design and by the remote location of mechanical equipment rooms. But over-emphasis on cost-cutting to eliminate what may be considered "unnecessary frills," will often dictate cheaper, roof-mounted units that are very difficult to isolate from spaces needing quiet. If such dangers are not recognized well in advance, it may not be possible to correct them later.

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Highlights of the upcoming Cambridge meeting

The June 1994 meeting in Cambridge, Massachusetts, will be unique in a number of ways. First, the regular ASA meeting will be preceded by the Sabine Centennial celebration (see Fall 1993 issue of *Echoes*), which will include three days of dinners, concerts, and tours, as well as distinguished lectures and invited papers exploring all aspects of Sabine's influence on architectural acoustics.

A new feature is the opportunity to pre-register for the meeting, lodging, and social events (see white handout in the Call for Papers). Those who register by May will save $10. Also, dormitory accommodations on the MIT campus are available (see grey handout in the Call for Papers), and should be reserved by June 1. Although the rooms are not air-conditioned, they are inexpensive and convenient, located close to the meeting and dining rooms that will be used during the meeting. Early registration is also suggested for the clambake, to be held on Tuesday evening, June 7.

A Tutorial Lecture on Architectural Acoustics will be presented by Gary Siebein on Wednesday, June 8 (not on June 6, as stated on the pink handout). Those who register by May 1 will save $10. There will also be a short course on Modal Analysis on June 5 and 6 presented by Uwe Hansen and Colin Ratcliffe (see gold handout). During a special session on Global Acoustics, a Distinguished Lecture will be presented by L.M. Brekhovskikh.

Highlights of the technical program include several other interesting sessions in addition to the Sabine Centennial. For example: Acoustical monitoring of environmental pollution; Workshop on the future of engineering acoustics; Music and technology; Foundations for predicting/preventing noise-induced hearing loss; Memorial tribute to Hallowell Davis; and a Celebration of 30 years of research at the MIT Acoustics & Vibration Lab. (This list is by no means complete.)

Tokyo String Quartet to play

One of the star attractions of the upcoming meeting in Cambridge will be the concert of the Tokyo String Quartet on Monday, June 6. During the first half, these famous musicians will play selections from well known string quartets using sets of instruments made by three prominent contemporary American luthiers, as well as their own 18th century Italian instruments. The audience will have the opportunity to compare the sounds of the old and new instruments. The concert will be preceded by a popular lecture on violin acoustics by Gabriel Weinreich, Professor of Physics at the University of Michigan. Because the concert is expected to be sold out, tickets should be purchased as soon as possible. A letter has been sent to all ASA members describing procedures for ordering them.

Peter Oundjian, first violinist; Kikuei Ikeda, second violinist; Kazuhide Isomura, violist; Sadao Harada, cellist

Recent ASA Awards

Hunt Fellowship

On the recommendation of the Committee on Special Fellowships, the Executive Council has selected **T. Douglas Mast** as the 1994 F.V. Hunt Postdoctoral Fellow. The Hunt fellowship is accompanied by a $28,000 stipend over a period of 12 months. Mast plans to do his postdoctoral research at the Ultrasound Research Laboratory, University of Rochester, with Robert C. Waag. His topic will be "Ultrasonic Scattering: New Techniques for Measurement, Analysis, and Imaging."

Minority Scholarship

The ASA has selected **Brian L. Scott** of Pennsylvania State University as the first recipient of ASA's Minority Scholarship. The scholarship is for $12,500 over a 12-month period. Scott is studying for a master's degree in acoustics, with a primary interest in structural acoustics and vibration.

Student Awards

During ASA's Fall Meeting in Denver, three technical committees selected students and young presenters for awards.

NOISE: The Noise Committee selected two winners for its "Outstanding Paper by a Young Presenter" award: **William Constantine** of Washington State University, for a paper coauthored by C. Pezeshki and M. Mosher entitled, "Wavelet analysis of blade-vortex interaction noise"; and **Christine Verhaegen** of the Katholieke University, Leuven, Belgium, for the paper "Improvement of the spatial Hankel transform to determine the impedance of outdoor ground surfaces," coauthored by W. Lauriks and A. Cops.

SPEECH: The Technical Committee on Speech Communication gave its "Best Student Paper Award" to **Christopher Long** of the University of California, Los Angeles, for his presentation, "Acoustic analysis and synthesis of pathological voice qualities."

ENGINEERING: Winning the "Engineering Acoustics Student Paper Contest" was **Dorene Kewley** of Duke University for the paper "Feedforward control with higher-harmonic, time-averaged, gradient (H-TAG) descent algorithm."

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Shaping and interior finishes

Once a sufficiently quiet background is achieved, the interior shape of the space and the distribution of sound reflecting and sound absorbing materials should be tailored to the primary uses of the facility. This is relatively straightforward for a single-purpose space, such as a drama theater or recital hall having fixed locations for performers and audience. Here, walls and ceiling are designed to reinforce and distribute reflected sound to all seats, to control rear-wall echoes, and to ensure that reverberation is appropriate for its specified uses.

By contrast, in most convention facilities the ability to subdivide large spaces with movable partitions precludes special shaping of walls and ceiling. In addition, the control of excessive reverberation and crowd noise, as for a community dinner, necessitates large areas of sound absorbing materials on the walls and ceiling. In cases where sound needs to be projected or redirected, a portable sound reflecting enclosure, such as an orchestra shell, could help to overcome the limitations imposed by unwanted sound absorption, allowing a meeting room to double as a performance space.

Sound amplification

More than any other feature of the convention facility, the sound amplification system is the target of customer complaints. The obvious conclusion is that particular attention should be paid to the quality of both installation and operation. The system must be designed to serve each subdivided space as well as the largest room configuration, always with a minimum of technical staff, implying push-button controls. The precise functions of the system need to be defined at the outset, but it is also important to ensure that later additions and modifications may be made without difficulty.

Getting things built

Probably the most difficult part of building a convention center is making sure that the design is properly executed. Details that have been incorporated in the drawings must now be built by workers who have little awareness of the special construction needed for noise control. Potential conflicts between trades, such as installation of piping where ducts should go, dictate on-the-job revisions without which the quality of the building could be seriously impaired. Any

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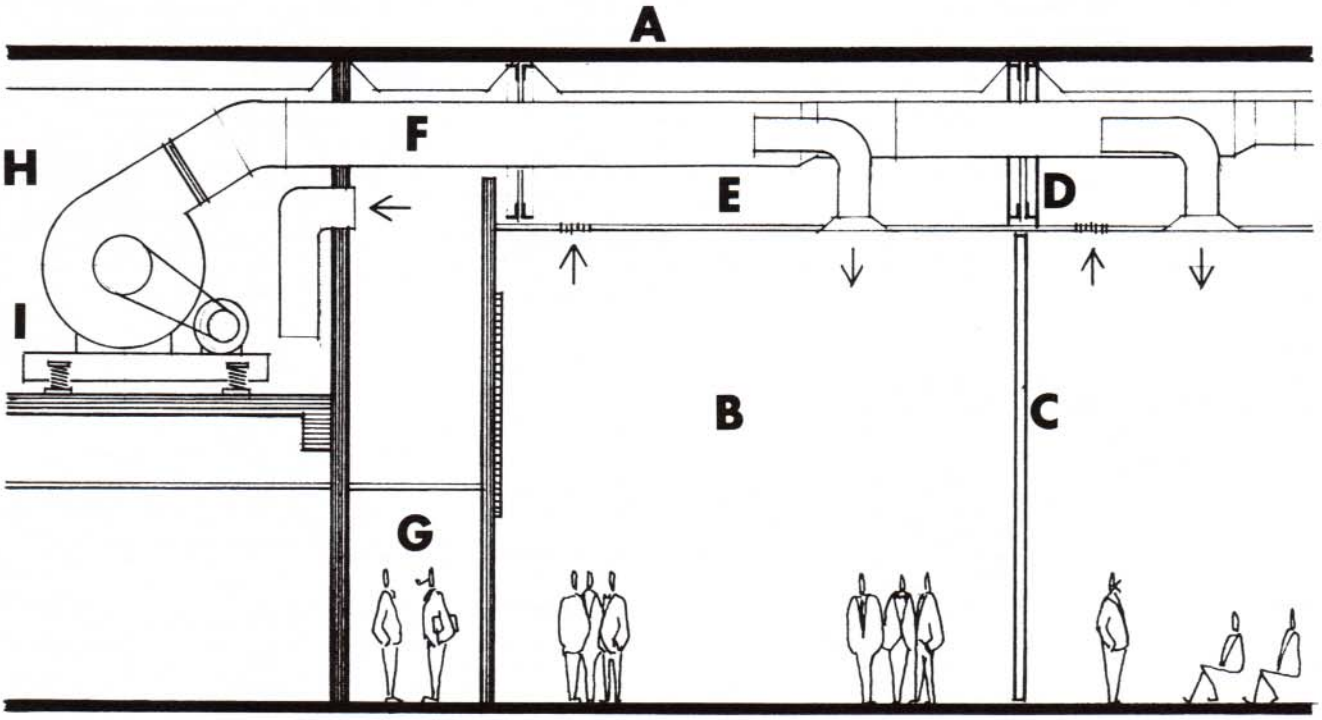


A. Wall and roof construction control intruding noise from ground traffic, aircraft, and sirens.
B. Divisible conference space with movable, sound-rated partitions and sound-absorbing ceiling and wall surfaces.
C. Movable partition, built up from sections and supported from overhead track, stacks away when not in use, requires care when setting up to avoid gaps at edges.
D. Partition closes off ceiling cavity to avoid transmission of sound over movable partition.
E. Ceiling cavity accommodates roof structure, supply air ducts, return air route, lighting, etc.
F. Supply air ducts acoustically lined to control fan noise and avoid crosstalk between spaces.
G. Corridor serves as sound "buffer" between conference spaces and service spaces.
H. Ventilation equipment rooms of heavy masonry construction located above restrooms, storage, or other service spaces.
I. Ventilation equipment on spring mounts for control of vibration.

MEETING ROOMS—from pg. 4

decision to "fast-track" the work and not to have full-time supervision may ultimately be regretted.

These may seem like common-sense issues, but too many examples of unpleasant meeting facilities point up the need for explicitly defining the acoustical requirements and keeping them in focus throughout design and construction. This practice could well mean the difference between a highly regarded meeting facility and an expensive white elephant. Clearly, there is a serious need for awareness of acoustics in the professional schools, in conjunction with an increased commitment by the ASA, as well as other groups, to the translation of acoustics principles into the commonplace elements of building.

Ewart Wetherill, better known as "Red," is a principal at Paoletti Associates in San Francisco. A former professor of architecture, he has been in the profession of building acoustics for 30 years. He has authored papers and edited a number of publications on the subject, including "Acoustics of Worship Spaces" with David Lubman, published by the ASA.

Helping acousticians in the former Soviet Union

The ASA has established a new committee, chaired by Peter Mikhalevsky, called the Selection Committee for Grants to Former Eastern Bloc Countries. This full committee institutionalizes the work started by an ad hoc committee under the leadership of Ira Dyer. Its mission is to evaluate requests for various kinds of support for acoustics in Eastern Europe, Russia, and other nations comprising the former Soviet Union. Those interested in additional information about the committee and its activities are encouraged to contact Peter Mikhalevsky: phone (703)827-4784, fax (703)893-8753, e-mail: Peter@fiji.osg.saic.com.

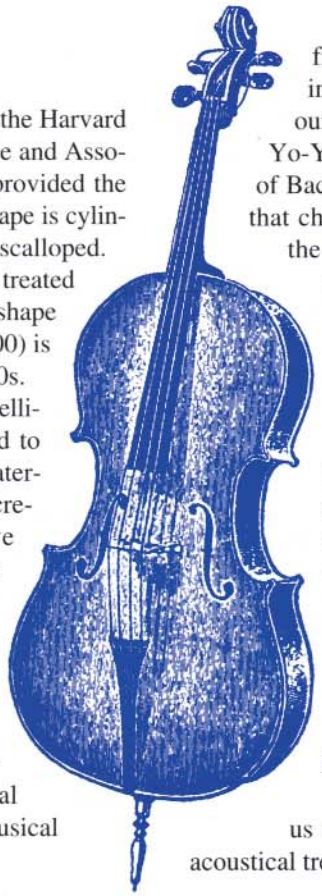
At this time the ASA has agreed to send 60 complete sets of the 1993 Journal and will begin sending 1994 issues to the International Science Foundation (ISF) in New York City. The ISF will reimburse ASA and will distribute the copies to selected libraries, universities, and research institutes in Eastern Europe and the former Soviet Union.

A delightful acoustical test

by Klaus Kleinschmidt
Cambridge Acoustical Associates

Not long ago a new chapel was inaugurated at the Harvard Business School. The architect is Moshe Safdie and Associates and Cambridge Acoustical Associates provided the acoustical consulting. The sanctuary's basic shape is cylindrical, with most of the concrete walls heavily scalloped. A longer concave wall segment is acoustically treated to 8 feet above the floor. The chapel's general shape and size (its seating capacity is slightly over 100) is not unlike MIT's Chapel built in the early 1950s.

In response to initial concerns about the intelligibility of unreinforced speech, we were asked to design a temporary installation of acoustical material for the large concave wall that could be incrementally adjusted in preparation for subjective testing of the sanctuary with voice and live music. The test provided an opportunity to try out thicker acoustical treatment, 2-inch as opposed to the original 1-inch wall absorber material, and a 4-mil plastic film facing to limit the loss of high-frequency liveness. The goal was to tilt the balance of the acoustical quality slightly more towards speech than the original design without giving up the well received musical quality of the space.



On the day of the acoustical evaluation, a friend of the architect joined our small group of investigators to provide the musical passages for our ears. The friend turned out to be no less than Yo-Yo Ma, an enthusiastic "assistant." His playing of Bach Cello Suites was glorious and so consistent that changes in listener and player positions and in the amount of acoustical treatment were readily perceptible. No quantitative measurements were made during the session, although the test session was recorded. The final decisions about acoustical treatment were based on the subjective impressions of the participants.

Perhaps Yo-Yo's presence should not have been so surprising since he has a knack for stepping out of his role as one of the world's great classical musicians and getting involved in all sorts of unexpected projects, including excursions into the jazz idiom. He expressed great interest in our impromptu explanations of reverberation, flutter echoes, focusing, and the effect of absorption by the audience. The "audience" in these tests consisted of several rolls of 4-foot high, 2-inch thick flexible glass-fiber duct liner.

Yo-Yo and his Stradivarius cello provided us with a most entertaining way to optimize the acoustical treatment of a room.

Call for entries—ASA's Science Writing Awards

The Acoustical Society of America is requesting entries for its annual science writing awards for items published or aired during 1993. One award will be presented to a journalist (print, photo, video, or audio) and the other to a professional in acoustics. The awards will be presented during the plenary session at ASA's Fall Meeting in Austin, Texas, and will be accompanied by a check for $1000.

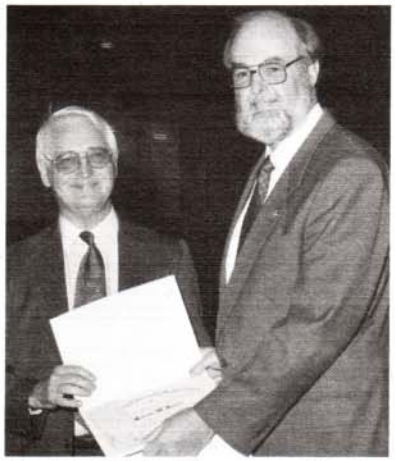
The purpose of the awards is to recognize and stimulate distinguished writing (or producing) that improves the general public's understanding and appreciation of acoustics. Criteria on which the entries will be judged may include: relevance to acoustics, accuracy, understandability to lay persons, interest/newsworthiness, size of audience or readership, clarity of communication, and originality.

The two 1992 award winners were recognized during the plenary session of ASA's recent meeting in Denver. The journalist's award was presented to Malcolm W. Browne, senior science writer for *The New York Times,* for a group of four articles on acoustics that appeared during 1992. In addition to being a distinguished science writer, Browne is also renowned for his long career as a foreign correspondent in such posts as Viet Nam, the former Soviet Union, and the Persian Gulf area. His autobiography, *Muddy Boots and Red Socks,* was recently published by Times Books / Random House.

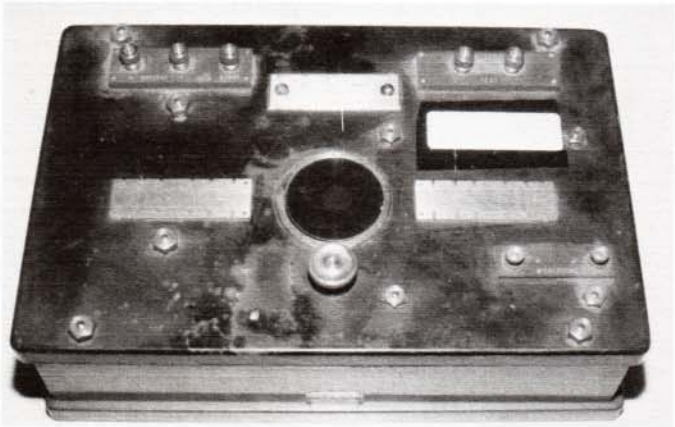
The science writing award for acousticians was presented to Thomas M. Georges, a physicist at the National Oceanic and Atmospheric Administration (NOAA) Environmental Research Laboratories in Boulder, Colorado, for his article "Taking the ocean's temperature with sound." The article appeared in the July 1992 issue of *The World and I.* Georges had participated in the Heard Island Experiment at the Ascension Island receiving station (see *Echoes* , Vol. 1, No. 4, Winter, 1991). He has also written a manual entitled *Business and Technical Writing Cookbook,* published by Syntax Publications, Boulder, Colorado.

Entries for the 1993 awards should be postmarked no later than April 15, 1994 and sent to: ELAINE MORAN, ACOUSTICAL SOCIETY OF AMERICA, 500 SUNNYSIDE BLVD., WOODBURY, NY 11797
For further information call 516-576-2360

President Richard Lyon presenting the Science Writing Award for Journalists to Malcolm W. Browne



President Richard Lyon presenting the Science Writing Award for Professionals in Acoustics to Thomas M. Georges



What is it?

The photo shows a "Microphone Hummer," a device donated to ASA's Museum of Architectural Acoustics at the Riverbank Acoustical Laboratories in Geneva, Illinois. Unfortunately, no documents were provided by the donor and the purpose of the device remains a mystery. John Kopec, Chair of ASA's Committee on Archives and History, reports that none of the museum's many visitors have been able to reveal what it does, what it's used for, or anything else about it. But people have raised a number of interesting questions, such as: Does the device actually make a microphone hum? Or does the microphone make it hum? Or do both in combination hum?

Microphone Hummer, courtesy of John Kopec, Riverbank Acoustical Laboratories. The labels read as follows: ***Upper left plate*** *(three terminals): " + Battery Earth "; **Upper center plate:** "CAMPBELL MICROPHONE HUMMER, No 35, Robt. W. Paul, London, N"; **Upper right plate:** "TEST"; **Right center** (museum's label): "Donated from Department of Physics, Bowdoin College, Brunswick, Maine"; **Lower right plate** (two terminals): "Microphone"; **Small label center** (front): "Robt. W. Paul, East 42nd Street, New York." Anyone with information or theories about the device is invited to call John Kopec (708)232-0104.*

ASA co-sponsors programs

Satellite symposia:

An Educational Workshop on Aircraft Noise for the Citizen, Seattle, April 1994, will cover noise measurement and effects, impact assessment, and regulation and policy pertaining to aircraft/airport noise. Additional sponsors include the Seattle-Tacoma Port Authority and the Regional Council on Aircraft Affairs. Contact Charles Schmid, 516-576-2360.

Issues in Advanced Hearing Aid Research will be jointly sponsored with the House Ear Institute, May30–June3, 1994, at the Lake Arrowhead Conference Center in California. The conference is being chaired by Diane Van Tasell of the University of Minnesota, Louis Braida of MIT, and Stuart Gatehouse of the Medical Research Council in Glasgow. Other sponsors include the American Academy of Audiology and the Hearing Industries Association. Contact Sigfrid Soli, 213-483-4431.

Physical Acoustics Summer School: The Office of Naval Research (ONR), in cooperation with the ASA and the National Center for Physical Acoustics (NCPA), will sponsor another summer session at the Asilomar Conference Center, Pacific Grove, California, June 24–July 1, 1994. Enrollment will be limited to a total of 50: 30 students and 20 lecturers and discussion leaders. Although the deadline to apply for student fellowships was Feb. 10, applications for regular registration will be accepted until the total has been achieved. Contact Henry Bass at the NCPA, 601-232-5840.

Other jointly sponsored meetings:

Third International Congress on Air- and Structure-borne Sound and Vibration, June 13–15, 1994, at the Hotel Le Chateau Champlain in Montreal. Presenters are still welcome, but must respond quickly since conference proceedings will be published. Contact Malcolm Crocker, 205-844-3310.

Symposium on Materials in Musical Instruments: In San Francisco, April 6 and 7, 1994, the ASA will co-sponsor a special symposium on materials used in the making of musical instruments. The symposium will be embedded in the general meeting of the Materials Research Society, and will consist of four sessions: stringed instruments, wind instruments, piano, and percussion. Contact Uwe Hansen, 812-237-2044.

ASA's 1998 Spring Meeting in Seattle will be held in conjunction with the **International Congress on Acoustics (ICA)**. Between 1500 and 2000 participants are expected, approximately twice the attendance at regular ASA meetings. Participants will be requested to contribute expanded abstracts well in advance, so that proceedings will be available at the time of the meeting. Contact Larry Crum, 206-685-8622.

In addition, ASA's Executive Council has also approved co-sponsorship of: (1) **NOISE-CON 94, the National Conference on Noise Control Engineering**, Fort Lauderdale, Florida, May 1–4, 1994, technical chair, Joseph Cuschieri; (2) **International Conference on Spoken Language Processing**, Japan, October 1994, contact Larry Rabiner; (3) **Third Hearing Conservation Conference**, in conjunction with the National Institute for Occupational Safety and Health and the National Hearing Conservation Association, Cincinnati, Ohio, March 22–24, 1995, contact John Franks; (4) **Symposium on Active Noise and Vibration Control** chaired by Jiri Tichy, July 6–8, 1995, Newport Beach, California, co-sponsored by the Acoustical Society of Japan, INCE, and INCE Japan.

Status of Women in ASA

At the recent meeting in Denver the Committee on the Status of Women held its second reception, attended by approximately 50 people. In addition to networking and socializing, there was a half-hour panel and open discussion on issues of interest, such as why ASA still has relatively few women members and the distribution of women members in the Society. Statistics suggest that the percentage of women is growing: about 12.5 percent in 1993, compared to less than 5 percent 20 years ago. Participation by women in Technical Committees is, however, quite uneven. For example, approximately 30 percent of the ASA members listing Speech as their primary affiliation are women, as compared to about 20 percent for Psychological and Physiological Acoustics, and only about 5 percent for most of the other specialties. Also, it appears that the rate at which women become Fellows is about half that of the men. This suggests that many of ASA's women members are relatively new to the Society and have not yet developed "tenure" in the system. Over time, the rate for men and women should become comparable.

More discussions, networking, and socializing are planned for the Women's Reception at the Cambridge meeting. All women are encouraged to come (including students, of course), and men are welcome as well.

Alexandra Tolstoy, Chair
Committee on the Status of Women

ReCreation report available

During the last two semi-annual meetings, a group of ASA members, invited by President Richard Lyon, met to discuss the future of the Society in what has been called the "ReCreation Process." The report summarizing this activity is currently being printed and should be available to ASA members by the time this issue of *Echoes* is received.

Acoustics in the News

THE NEWS ITEMS mentioned here are ones that have crossed the desk of the *Echoes* editor, thanks to the vigilance of ASA and AIP members and staff. These articles do not reflect the total coverage of acoustics by the media over recent months, because we may have missed quite a few. Consequently, readers are invited to share pertinent clippings with *Echoes* by sending them to ASA's Woodbury office. Readers should also remember that mention of these articles does not necessarily reflect ASA endorsement of their contents.

The December issue of ***Scientific American*** carried an article on sonoluminescence, "The color of sound," citing the work of ASA researchers Seth Putterman and Lawrence Crum, among others. (See also *Echoes,* Vol. 3, No.1.) Earlier in the fall, the October issue contained a short article about an ultrasonic device developed by Australian researchers to measure gas flow: "A wand for the meter reader" by Joshua Shapiro.

The subject of urban noise continues to be popular with the media. The Aug. 22 "View" section of the ***Los Angeles Times*** carried a lengthy story on noise in the Los Angeles area, "The noise plague" by Bettijane Levine. On the radio, WBZ in Boston aired a series called "Raising a racket about noise," by reporter Jacqueline Goddard, consisting of five three-minute segments. The second installment included an interview with ASA president Richard Lyon.

Once again, animal bioacoustics made headlines. A story by Malcolm Browne entitled "Human noises in ocean held to threaten marine mammals" appeared in ***The New York Times*** on Oct. 19. The article described ASA's special panel discussion in Denver devoted to the effects of noise on marine mammals, including the 120-dB limit that could be imposed on acoustical experiments in the ocean. Another article published by ***The Washington Post*** on Dec. 13, "Do dolphins dream of return to the deep?" (by Fern Shen), reported allegations by an animal rights group that construction noise was responsible for the ailing health of dolphins in the National Aquarium in Baltimore.

Another piece by Browne in ***The New York Times*** (Nov. 23), "Scientists seek warning of environmental problems in seas," discussed the development of new techniques for using sound in the ocean, especially from cracking polar ice, to predict global temperature changes. The article was based on information presented at the Acoustical Oceanography special session at the Denver meeting.

Other recent articles of interest in ***The New York Times*** include: a comprehensive story on bioacoustician Katy Payne and her research on the low-frequency and infrasonic communication of whales and elephants ("Picking up mammals' deep notes" by Jane Brody, Nov. 9; see also *Echoes,* Vol. 2, No. 3); an obituary of a Russian acoustician and inventor of the electronic musical instrument the "theremin" ("Leon Theremin, musical inventor, is dead at 97" by William Grimes, Nov.9); a description of a noise-cancellation device used by airline passengers to achieve a relaxing journey ("All quiet in economy class" by Hans Fantel, Oct. 10); and a short piece by Malcolm Browne on a British experiment, demonstrating temporary increases in nonverbal I.Q. after listening to Mozart, increases that were not experienced with other sound environments ("Eine Kleine Kopfmusic," Oct. 17).

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